FIGURE 1

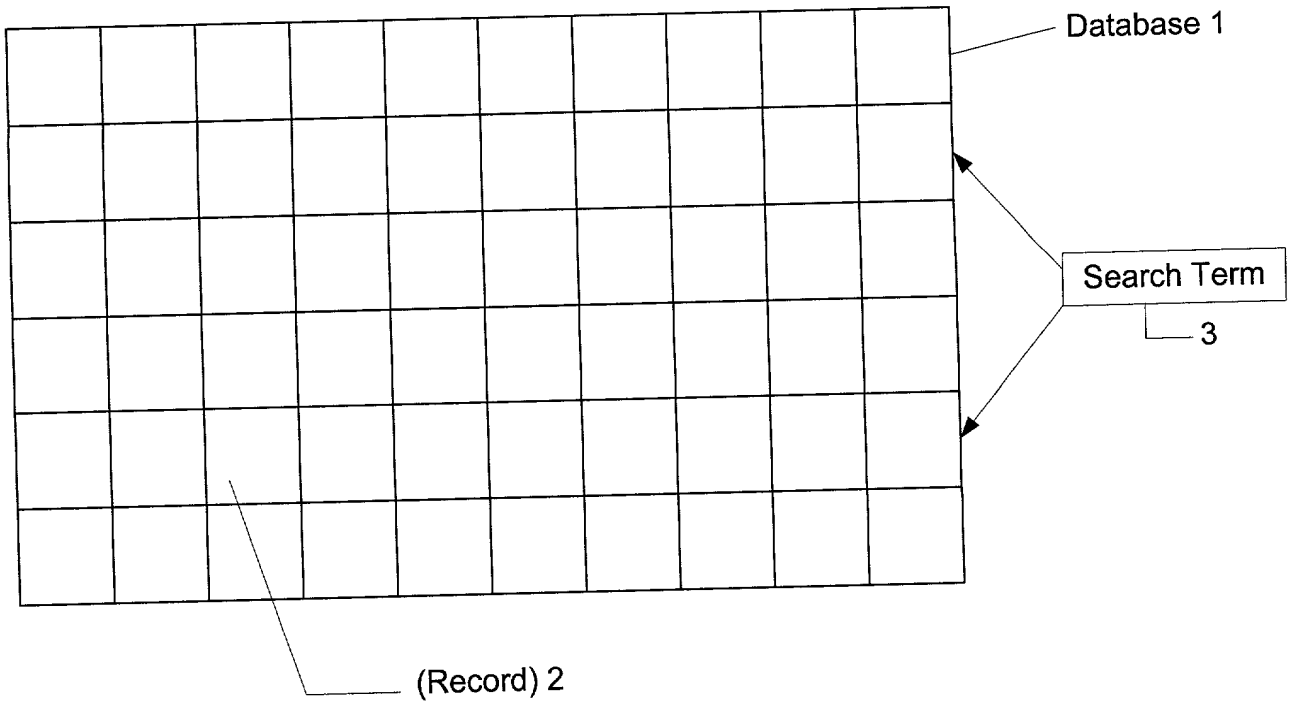


FIGURE 2

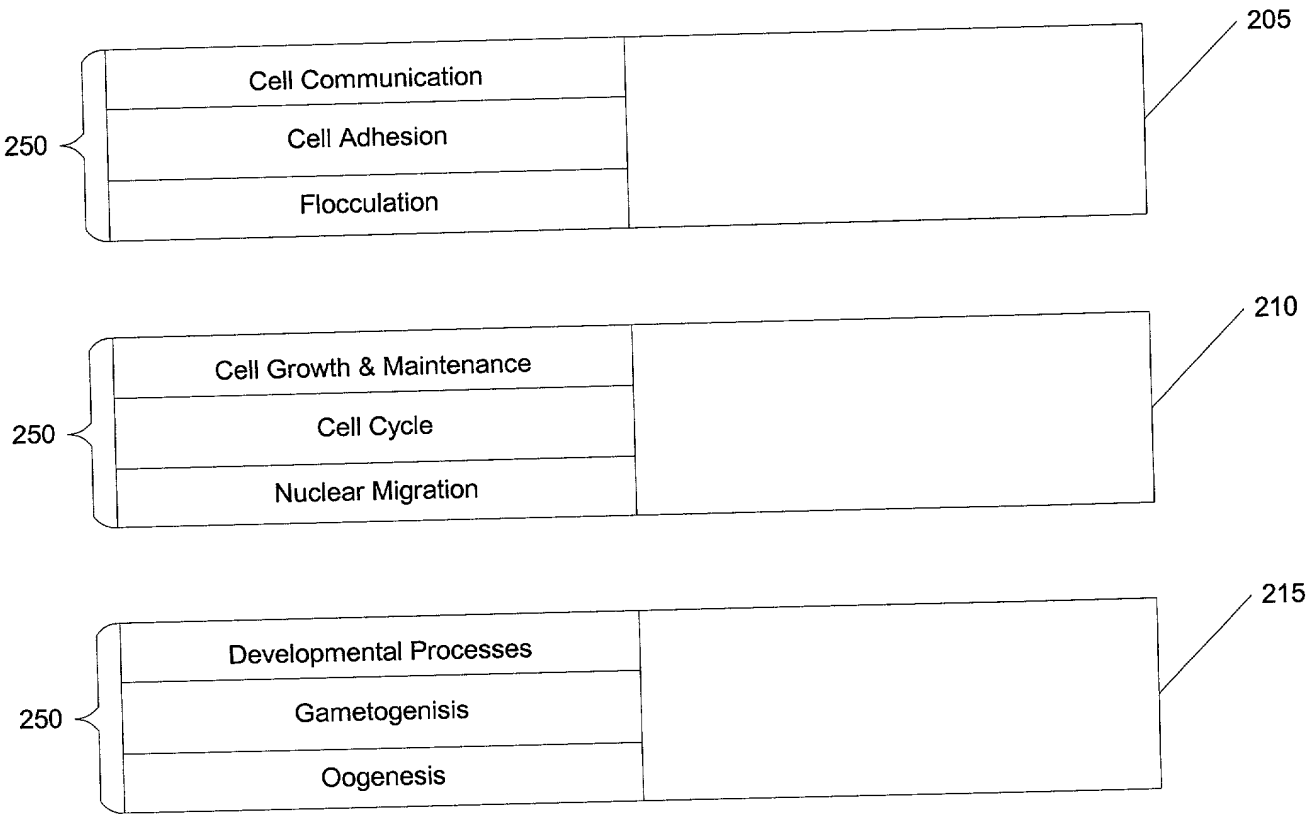


FIGURE 3

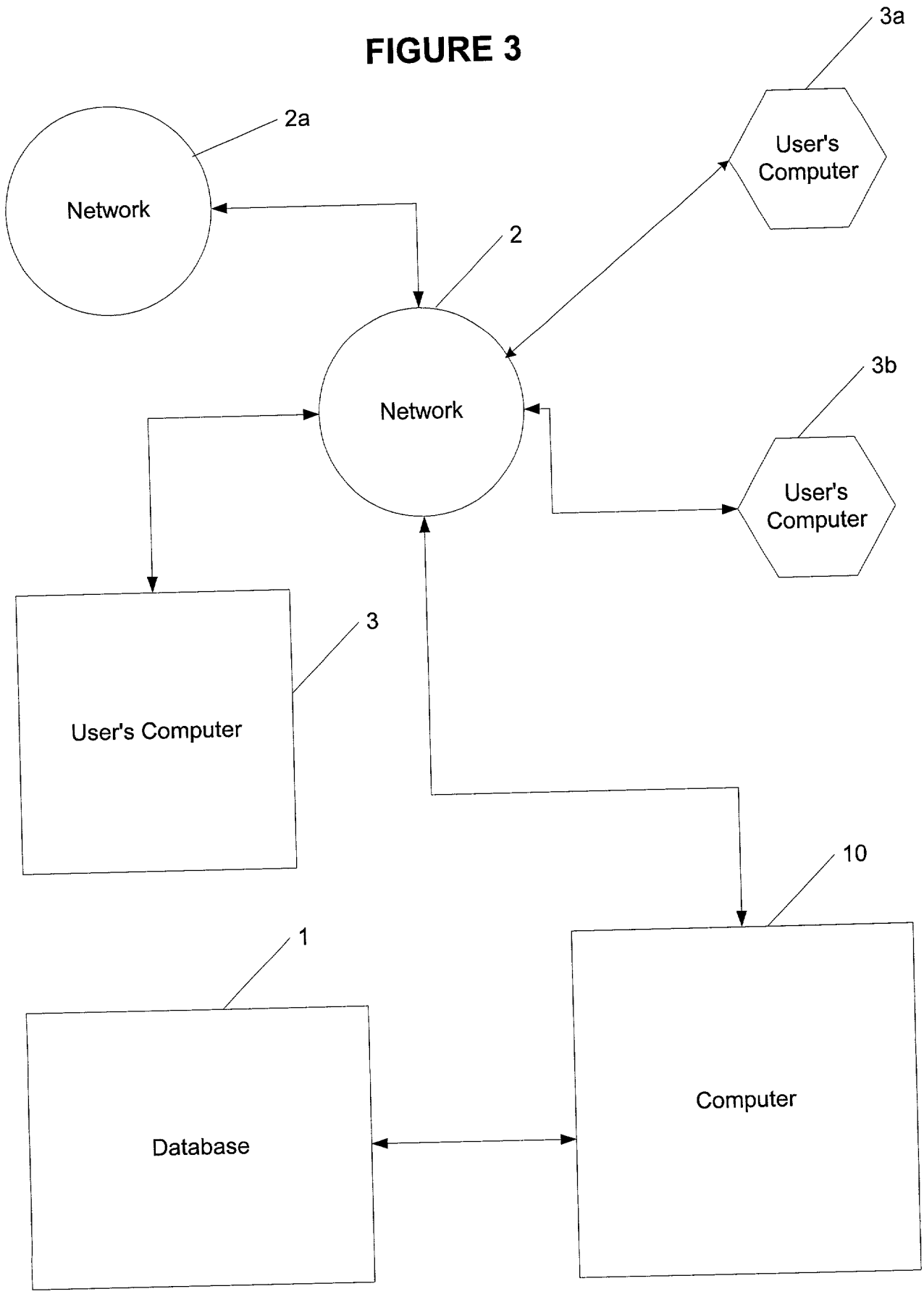

3a
User's Computer
2a
Network
2
Network
3b
User's Computer
User's Computer
3
10
1
Database
Computer

FIGURE 4

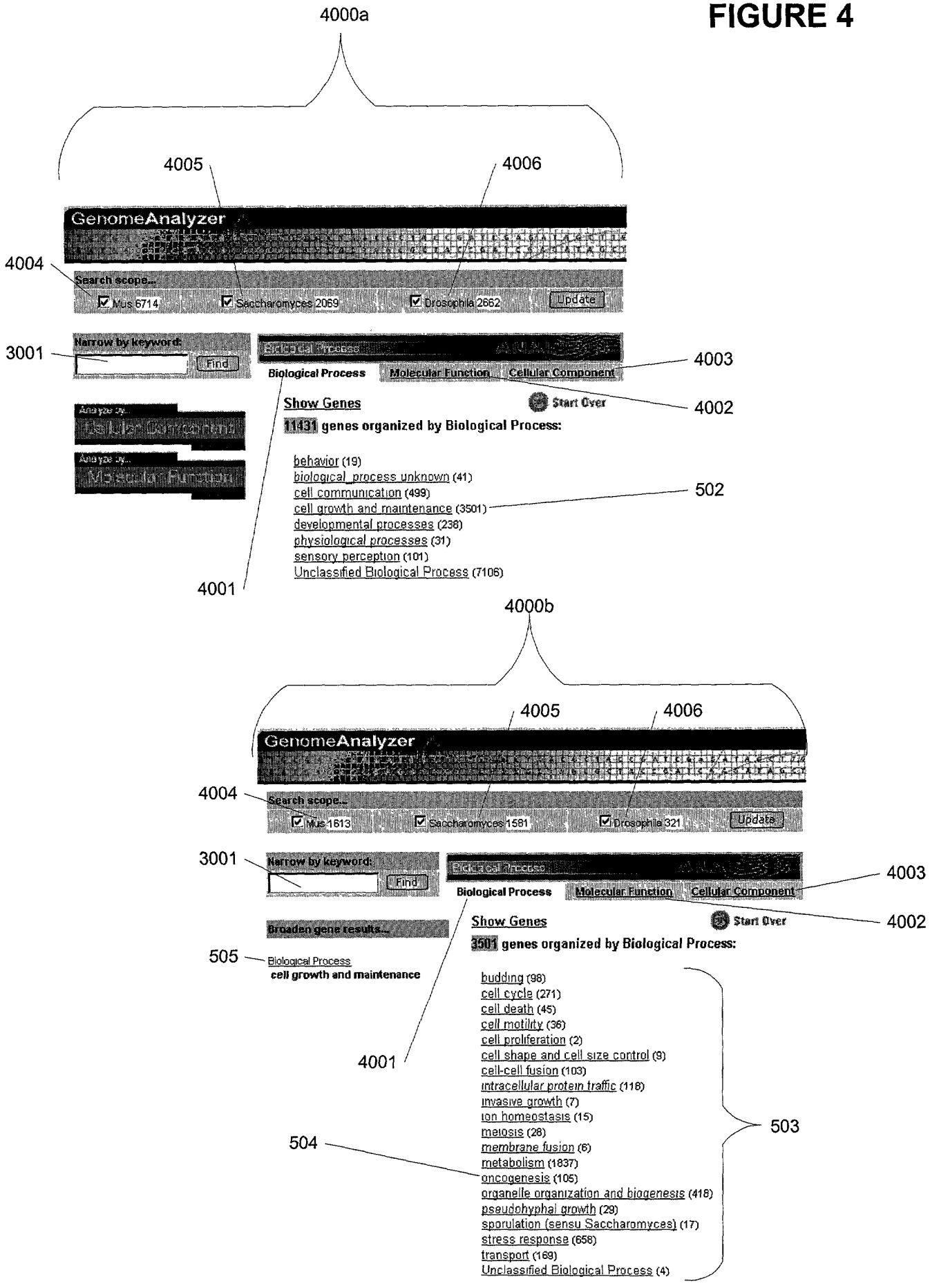

4000a
4005
4006
GenomeAnalyzer
4004
Search scope...
Mus 6714
Saccharomyces 2069
Drosophila 2662
Update
3001
Narrow by keyword:
Find
Biological Process
Molecular Function
Cellular Component
4003
4002
Show Genes
Start Over
11431 genes organized by Biological Process:
behavior (19)
biological_process unknown (41)
cell communication (499)
cell growth and maintenance (3501)
502
developmental processes (236)
physiological processes (31)
sensory perception (101)
Unclassified Biological Process (7106)
4001
4000b
4005
4006
GenomeAnalyzer
4004
Search scope...
Mus 1613
Saccharomyces 1581
Drosophila 321
Update
3001
Narrow by keyword:
Find
Biological Process
Molecular Function
Cellular Component
4003
4002
Broaden gene results...
Show Genes
Start Over
505
Biological Process
cell growth and maintenance
3501 genes organized by Biological Process:
budding (98)
cell cycle (271)
cell death (45)
cell motility (36)
cell proliferation (2)
cell shape and cell size control (9)
cell-cell fusion (103)
intracellular protein traffic (118)
invasive growth (7)
ion homeostasis (15)
meiosis (28)
membrane fusion (6)
metabolism (1837)
oncogenesis (105)
organelle organization and biogenesis (418)
pseudohyphal growth (29)
sporulation (sensu Saccharomyces) (17)
stress response (658)
transport (169)
Unclassified Biological Process (4)
4001
503
504

FIGURE 5

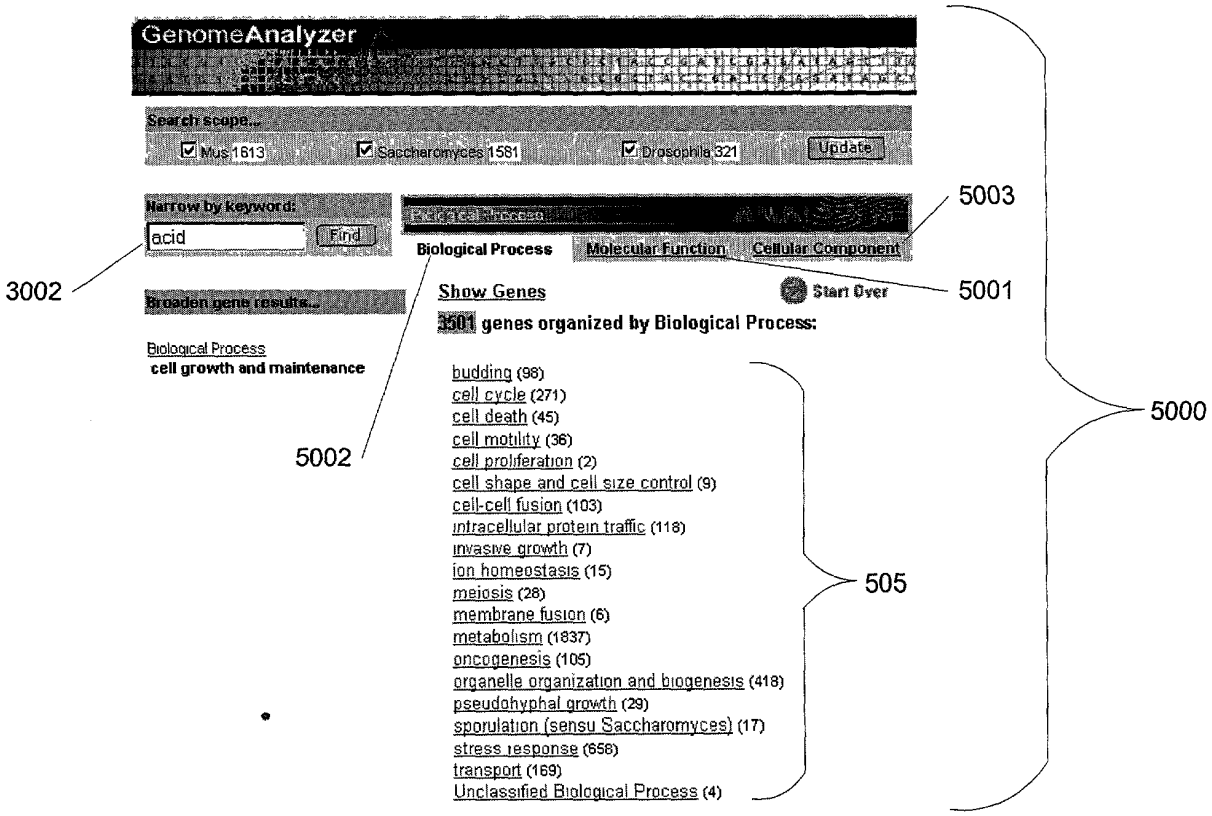


FIGURE 6

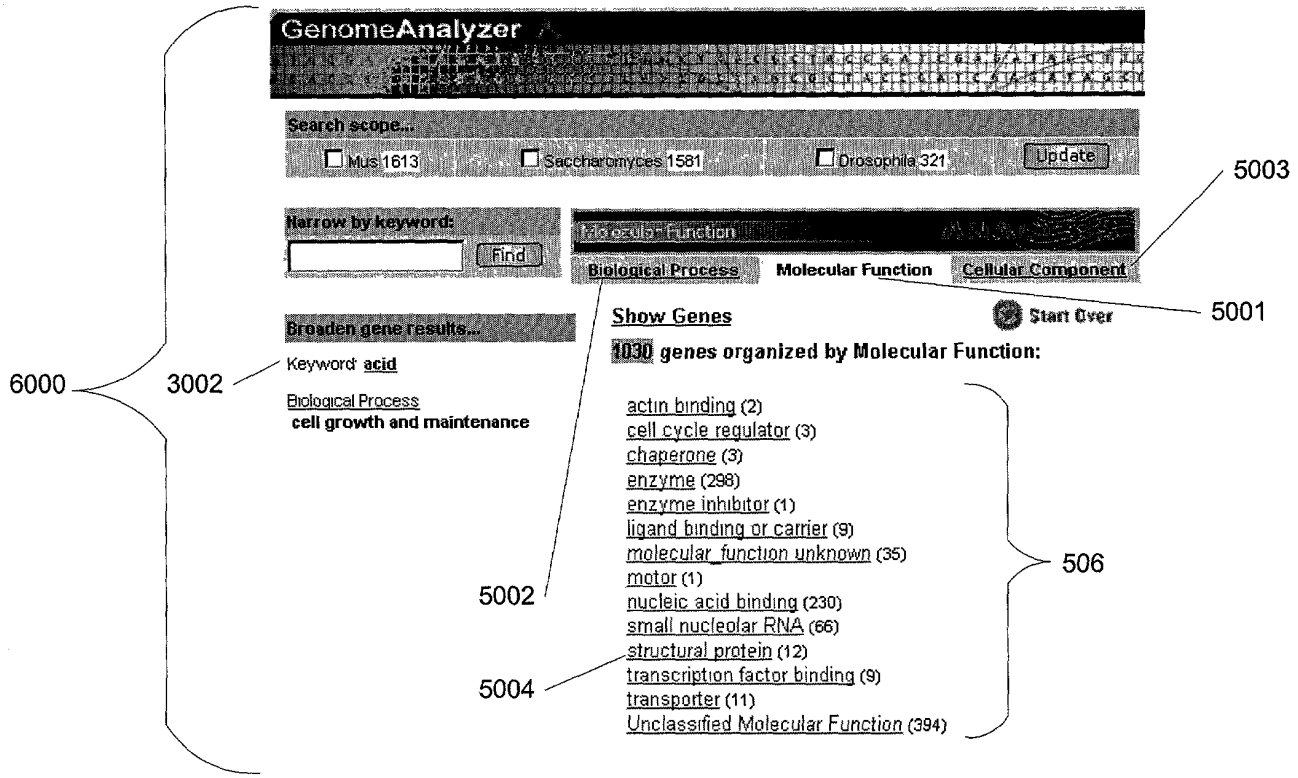


FIGURE 7

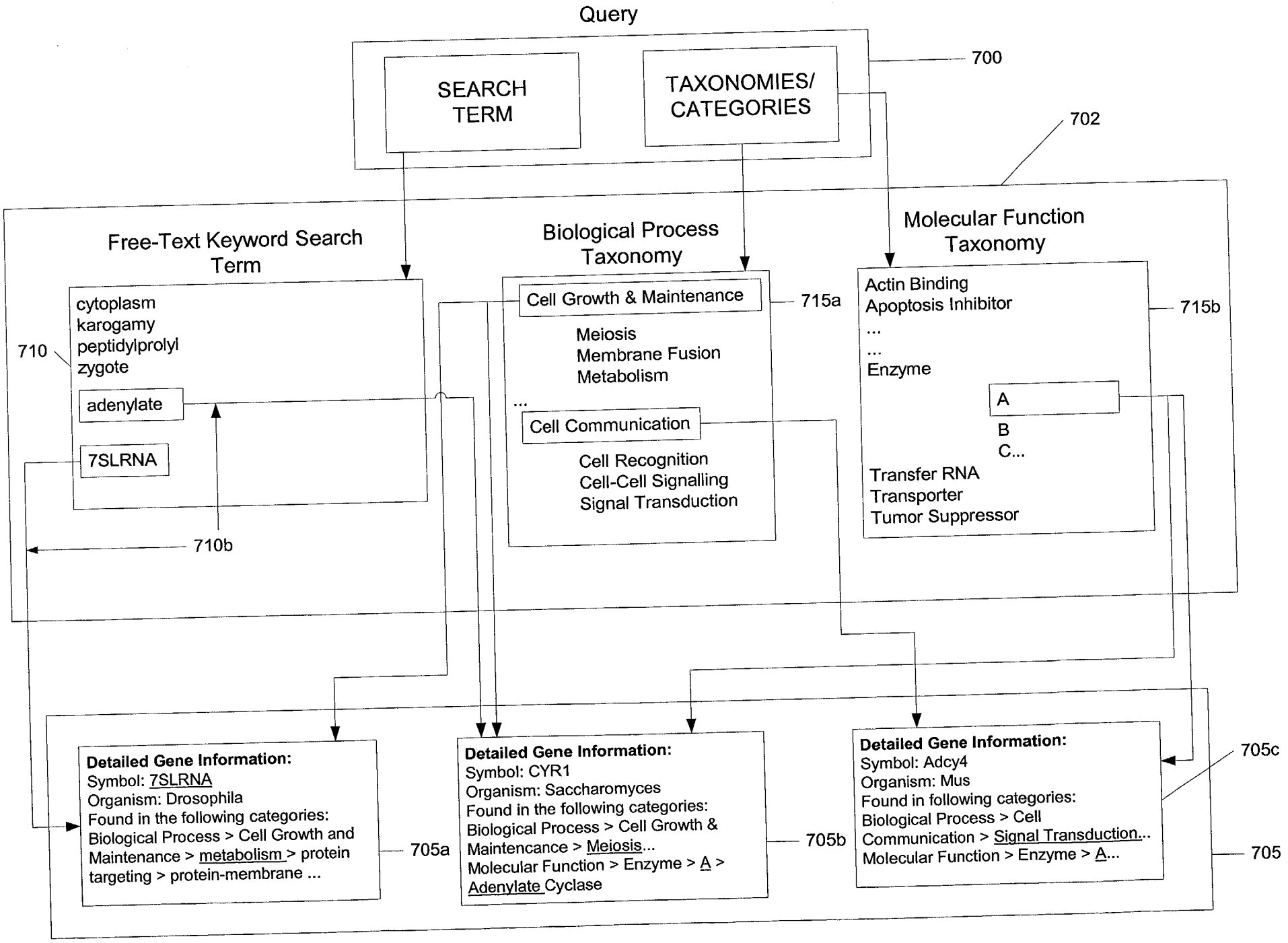

Query
SEARCH TERM
TAXONOMIES/ CATEGORIES
700
702
Free-Text Keyword Search Term
Biological Process Taxonomy
Molecular Function Taxonomy
cytoplasm
karogamy
peptidylprolyl
zygote
710
adenylate
7SLRNA
710b
Cell Growth & Maintenance
715a
Meiosis
Membrane Fusion
Metabolism
...
Cell Communication
Cell Recognition
Cell-Cell Signalling
Signal Transduction
Actin Binding
Apoptosis Inhibitor
...
...
Enzyme
A
B
C...
715b
Transfer RNA
Transporter
Tumor Suppressor
Detailed Gene Information:
Symbol: 7SLRNA
Organism: Drosophila
Found in the following categories:
Biological Process > Cell Growth and Maintenance > metabolism > protein targeting > protein-membrane ...
705a
Detailed Gene Information:
Symbol: CYR1
Organism: Saccharomyces
Found in the following categories:
Biological Process > Cell Growth & Maintencance > Meiosis...
Molecular Function > Enzyme > A > Adenylate Cyclase
705b
Detailed Gene Information:
Symbol: Adcy4
Organism: Mus
Found in following categories:
Biological Process > Cell Communication > Signal Transduction...
Molecular Function > Enzyme > A...
705c
705

FIGURE 8

1. INPUT — Select Taxonomy: Biological Process

2. RESULT
11,431 genes organized by **Biological Process**:
cell communication (499)
cell growth and maintenance (3,501)
developmental processes (238)...

3. INPUT — Enter Search Term: "acid"

4. RESULT
2,007 genes organized by **Biological Process** matching keyword(s): **"acid"**
behavior (5)
cell communication (35)
cell growth and maintenance (1,030)...

5. INPUT — Select Category: Cell Growth and Maintenance

6. RESULT
1,030 genes organized by **Biological Process** matching keyword(s): **"acid"**
budding (8)
cell cycle (38)
cell shape and cell size control (1)...

7. INPUT — Select Sub-Category: Cell Cycle

8. RESULT
38 genes organized by **Biological Process** matching keyword(s): **"acid"**
CDC14 Saccharomyces S0001924 SGD
CDC5 Saccharomyces S0004603 SGD
CST9 Saccharomyces L0002996 SGD...

9. INPUT — Select Taxonomy: Molecular Function

10. RESULT
38 genes organized by **Molecular Function** matching keyword(s): **"acid"**
enzyme (14)
nucleic acid binding (18)
transporter (1)...

11. INPUT — Select Category: Nucleic Acid Binding

12. RESULT
18 genes organized by **Molecular Function** matching keyword(s): **"acid"**
DNA binding (17)
RNA binding (1)

13. INPUT — Select Sub-Category: RNA Binding

14. RESULT
1 gene organized by **Molecular Function** matching keyword(s): **"acid"**
ssd1 Saccharomyces S0002701 SGD

FIGURE 9

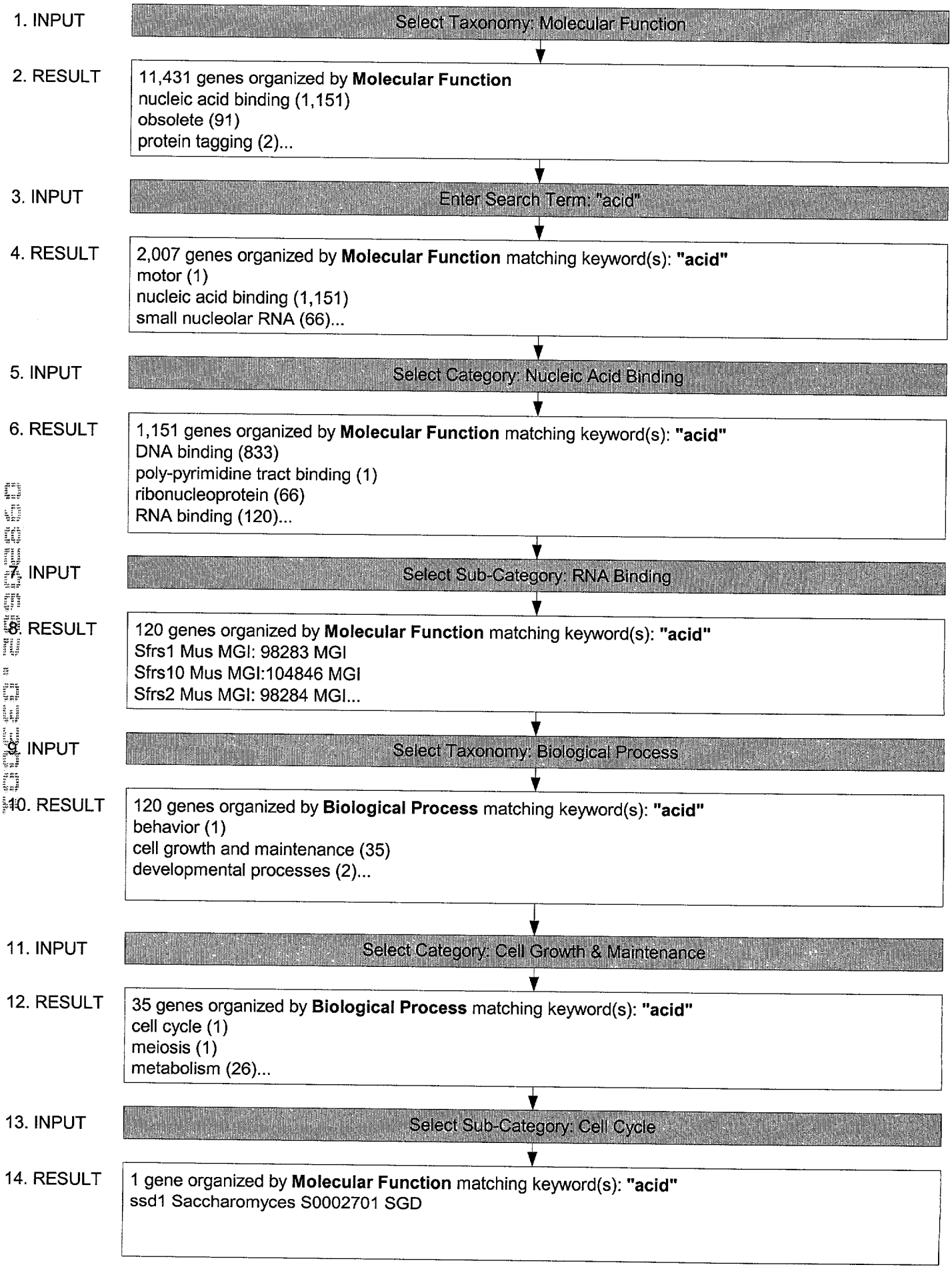

1. INPUT
Select Taxonomy: Molecular Function
2. RESULT
11,431 genes organized by **Molecular Function**
nucleic acid binding (1,151)
obsolete (91)
protein tagging (2)...
3. INPUT
Enter Search Term: "acid"
4. RESULT
2,007 genes organized by **Molecular Function** matching keyword(s): **"acid"**
motor (1)
nucleic acid binding (1,151)
small nucleolar RNA (66)...
5. INPUT
Select Category: Nucleic Acid Binding
6. RESULT
1,151 genes organized by **Molecular Function** matching keyword(s): **"acid"**
DNA binding (833)
poly-pyrimidine tract binding (1)
ribonucleoprotein (66)
RNA binding (120)...
7. INPUT
Select Sub-Category: RNA Binding
8. RESULT
120 genes organized by **Molecular Function** matching keyword(s): **"acid"**
Sfrs1 Mus MGI: 98283 MGI
Sfrs10 Mus MGI:104846 MGI
Sfrs2 Mus MGI: 98284 MGI...
9. INPUT
Select Taxonomy: Biological Process
10. RESULT
120 genes organized by **Biological Process** matching keyword(s): **"acid"**
behavior (1)
cell growth and maintenance (35)
developmental processes (2)...
11. INPUT
Select Category: Cell Growth & Maintenance
12. RESULT
35 genes organized by **Biological Process** matching keyword(s): **"acid"**
cell cycle (1)
meiosis (1)
metabolism (26)...
13. INPUT
Select Sub-Category: Cell Cycle
14. RESULT
1 gene organized by **Molecular Function** matching keyword(s): **"acid"**
ssd1 Saccharomyces S0002701 SGD

FIGURE 10

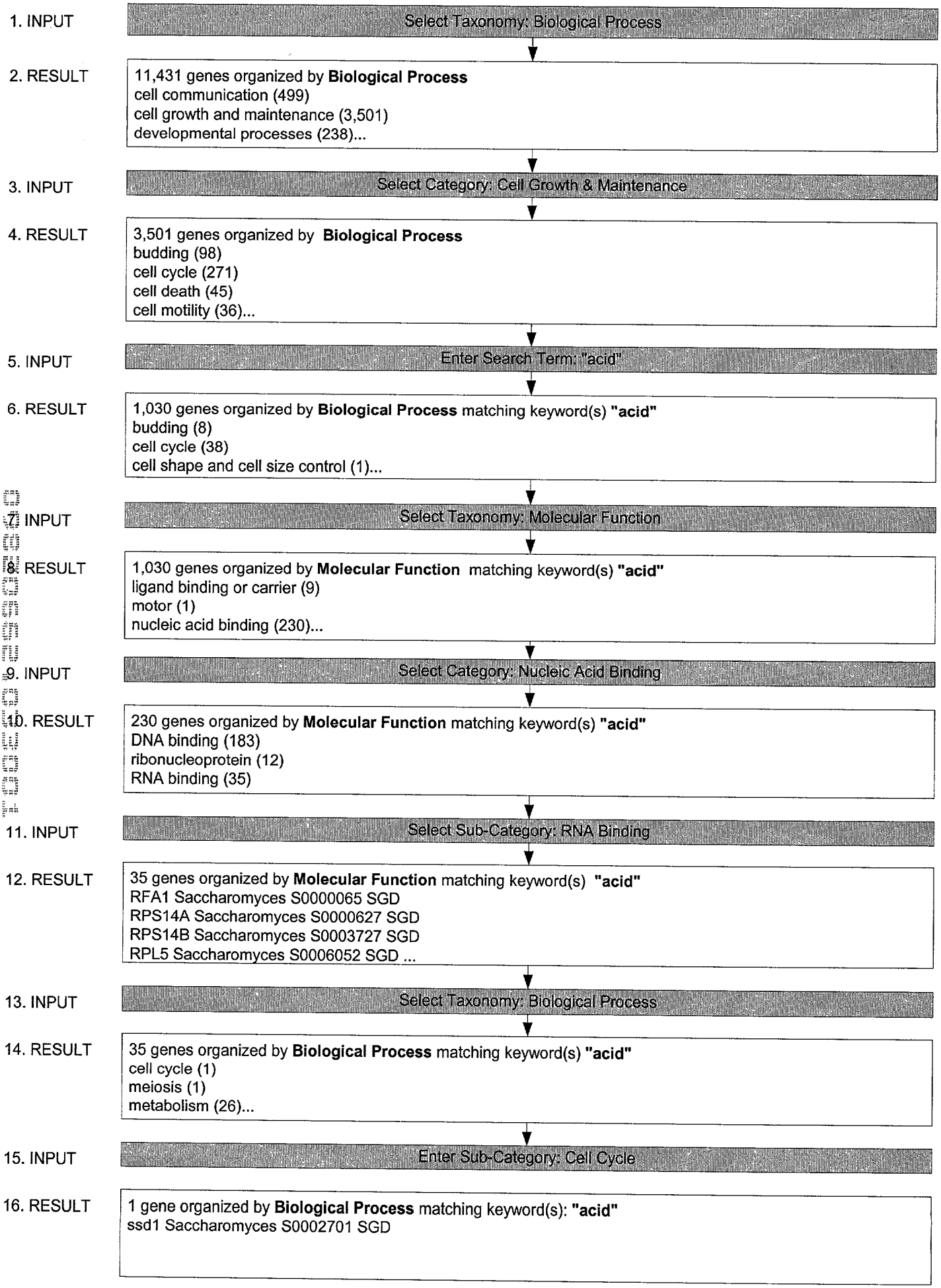

1. INPUT
Select Taxonomy: Biological Process
2. RESULT
11,431 genes organized by **Biological Process**
cell communication (499)
cell growth and maintenance (3,501)
developmental processes (238)...
3. INPUT
Select Category: Cell Growth & Maintenance
4. RESULT
3,501 genes organized by **Biological Process**
budding (98)
cell cycle (271)
cell death (45)
cell motility (36)...
5. INPUT
Enter Search Term: "acid"
6. RESULT
1,030 genes organized by **Biological Process** matching keyword(s) **"acid"**
budding (8)
cell cycle (38)
cell shape and cell size control (1)...
7. INPUT
Select Taxonomy: Molecular Function
8. RESULT
1,030 genes organized by **Molecular Function** matching keyword(s) **"acid"**
ligand binding or carrier (9)
motor (1)
nucleic acid binding (230)...
9. INPUT
Select Category: Nucleic Acid Binding
10. RESULT
230 genes organized by **Molecular Function** matching keyword(s) **"acid"**
DNA binding (183)
ribonucleoprotein (12)
RNA binding (35)
11. INPUT
Select Sub-Category: RNA Binding
12. RESULT
35 genes organized by **Molecular Function** matching keyword(s) **"acid"**
RFA1 Saccharomyces S0000065 SGD
RPS14A Saccharomyces S0000627 SGD
RPS14B Saccharomyces S0003727 SGD
RPL5 Saccharomyces S0006052 SGD ...
13. INPUT
Select Taxonomy: Biological Process
14. RESULT
35 genes organized by **Biological Process** matching keyword(s) **"acid"**
cell cycle (1)
meiosis (1)
metabolism (26)...
15. INPUT
Enter Sub-Category: Cell Cycle
16. RESULT
1 gene organized by **Biological Process** matching keyword(s): **"acid"**
ssd1 Saccharomyces S0002701 SGD

FIGURE 11

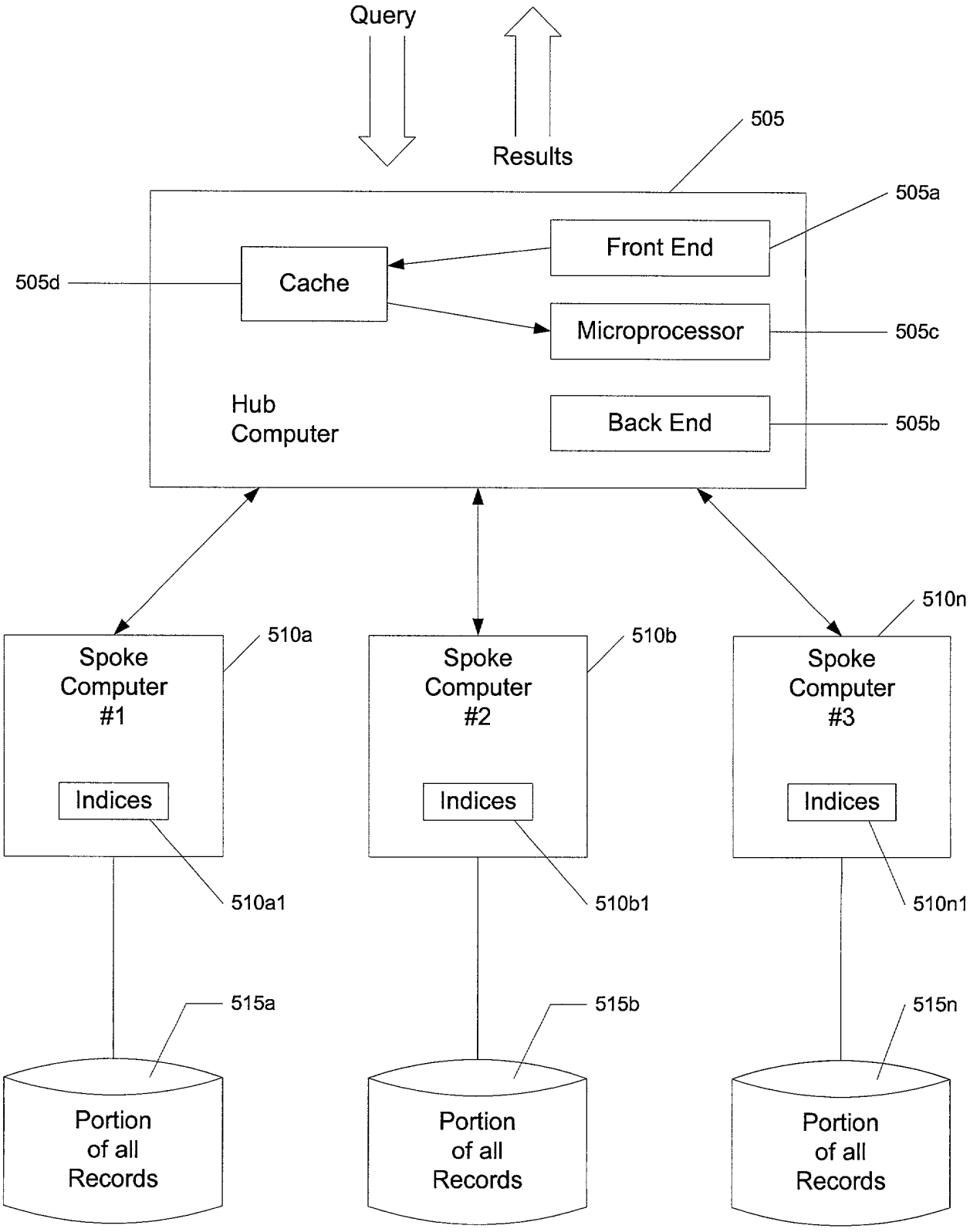

Query
Results
505
505a
Front End
505d
Cache
Microprocessor
505c
Hub
Computer
Back End
505b
510n
Spoke
Computer
#1
510a
Spoke
Computer
#2
510b
Spoke
Computer
#3
Indices
Indices
Indices
510a1
510b1
510n1
515a
515b
515n
Portion
of all
Records
Portion
of all
Records
Portion
of all
Records

FIGURE 12

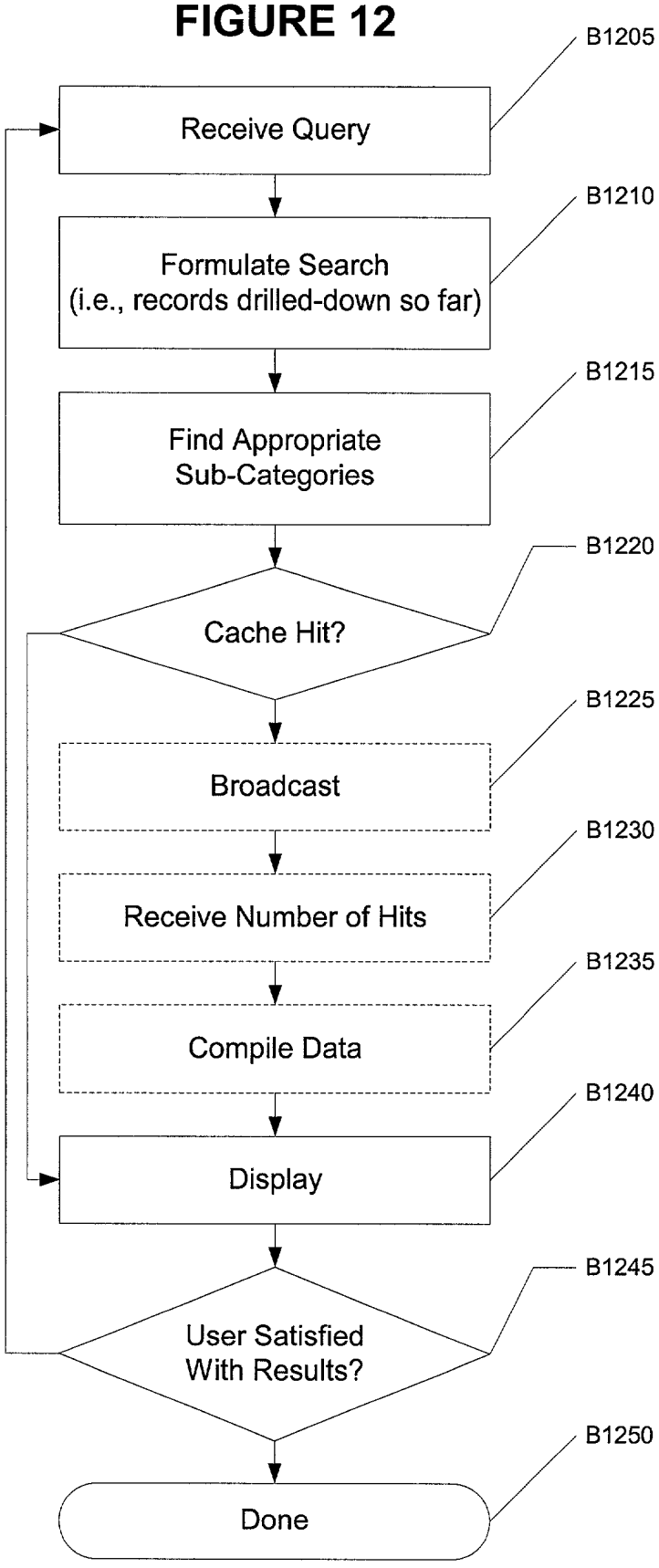

B1205
Receive Query
B1210
Formulate Search
(i.e., records drilled-down so far)
B1215
Find Appropriate
Sub-Categories
B1220
Cache Hit?
B1225
Broadcast
B1230
Receive Number of Hits
B1235
Compile Data
B1240
Display
B1245
User Satisfied
With Results?
B1250
Done

FIGURE 13

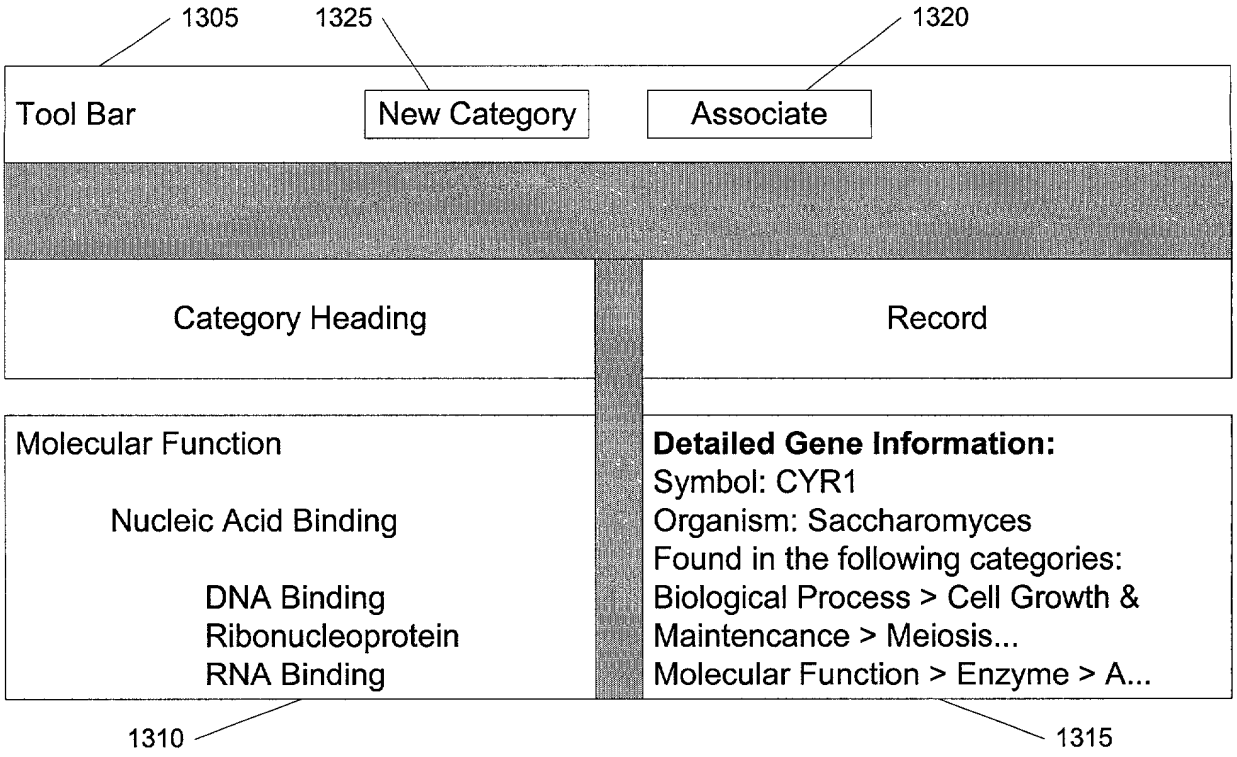
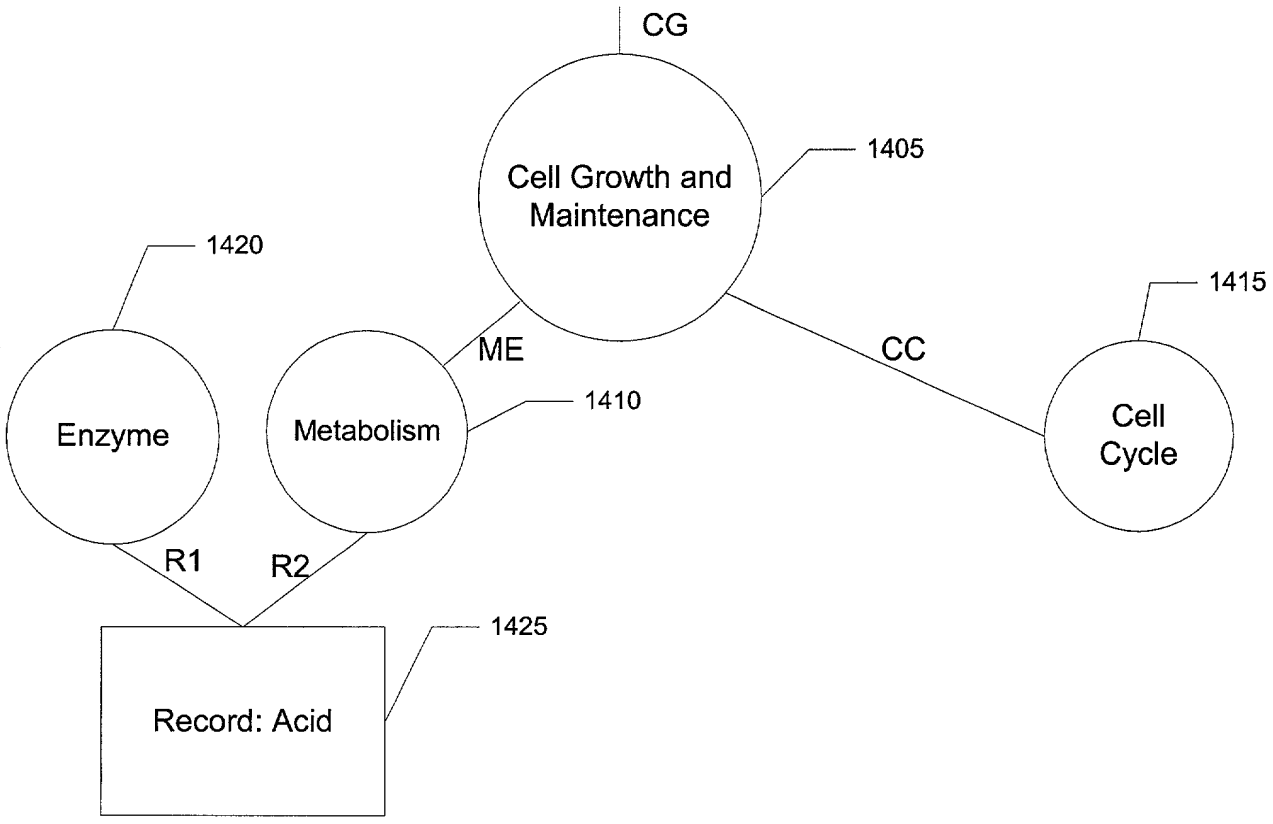


FIGURE 14



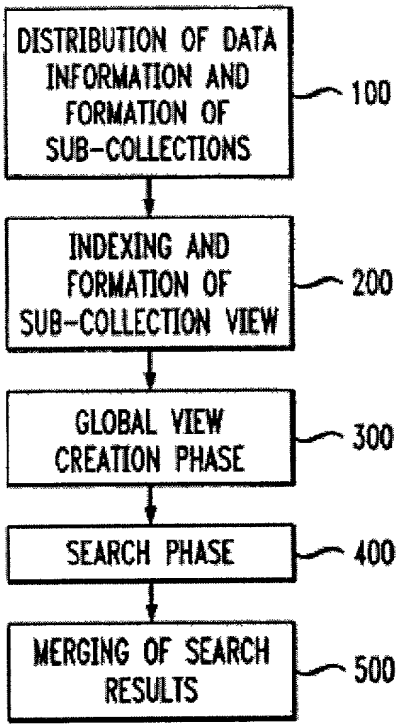

DISTRIBUTION OF DATA INFORMATION AND FORMATION OF SUB-COLLECTIONS
100
INDEXING AND FORMATION OF SUB-COLLECTION VIEW
200
GLOBAL VIEW CREATION PHASE
300
SEARCH PHASE
400
MERGING OF SEARCH RESULTS
500

FIGURE 15

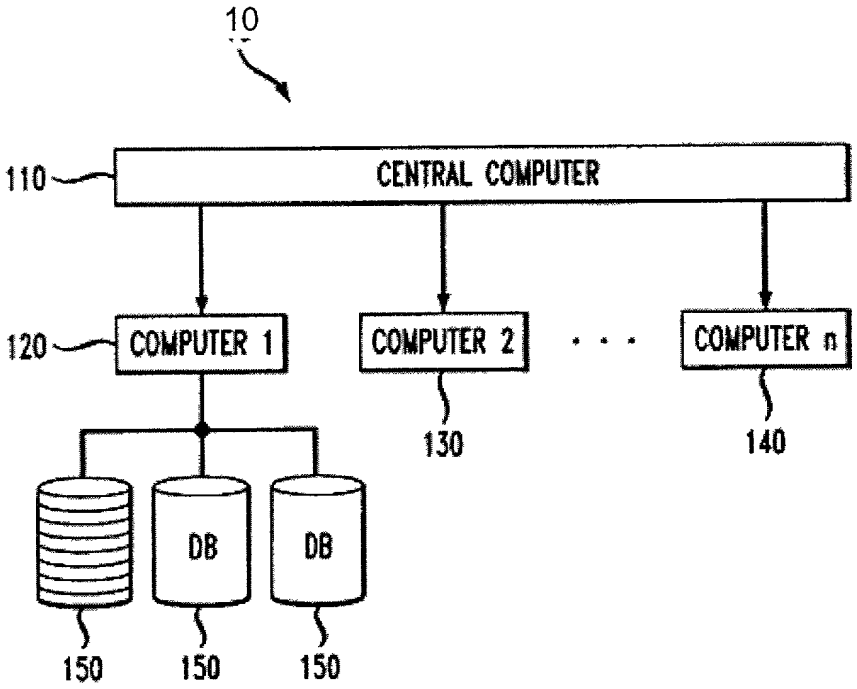

10
110
CENTRAL COMPUTER
120
COMPUTER 1
COMPUTER 2
COMPUTER n
130
140
DB
DB
150
150
150

FIGURE 16

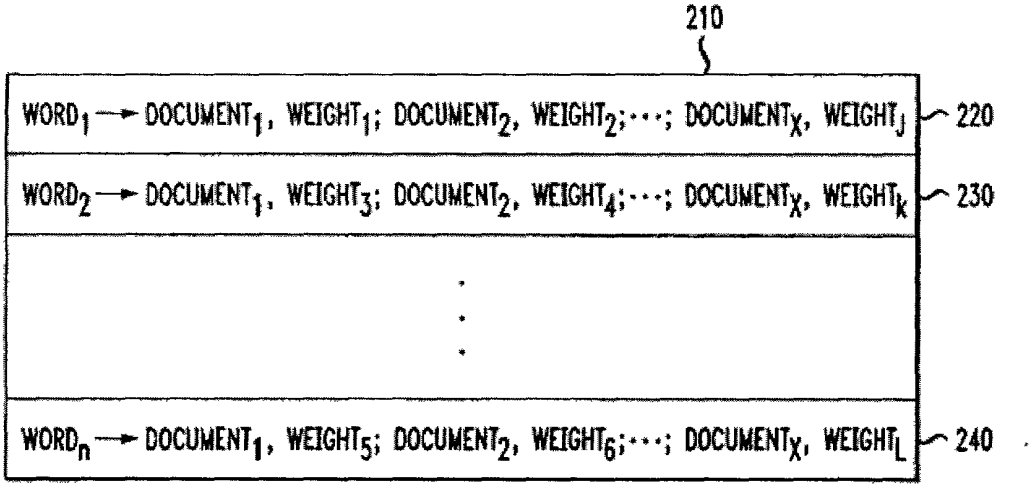

210
WORD1 → DOCUMENT1, WEIGHT1; DOCUMENT2, WEIGHT2;···; DOCUMENTX, WEIGHTJ
220
WORD2 → DOCUMENT1, WEIGHT3; DOCUMENT2, WEIGHT4;···; DOCUMENTX, WEIGHTK
230
WORDn → DOCUMENT1, WEIGHT5; DOCUMENT2, WEIGHT6;···; DOCUMENTX, WEIGHTL
240

FIGURE 17

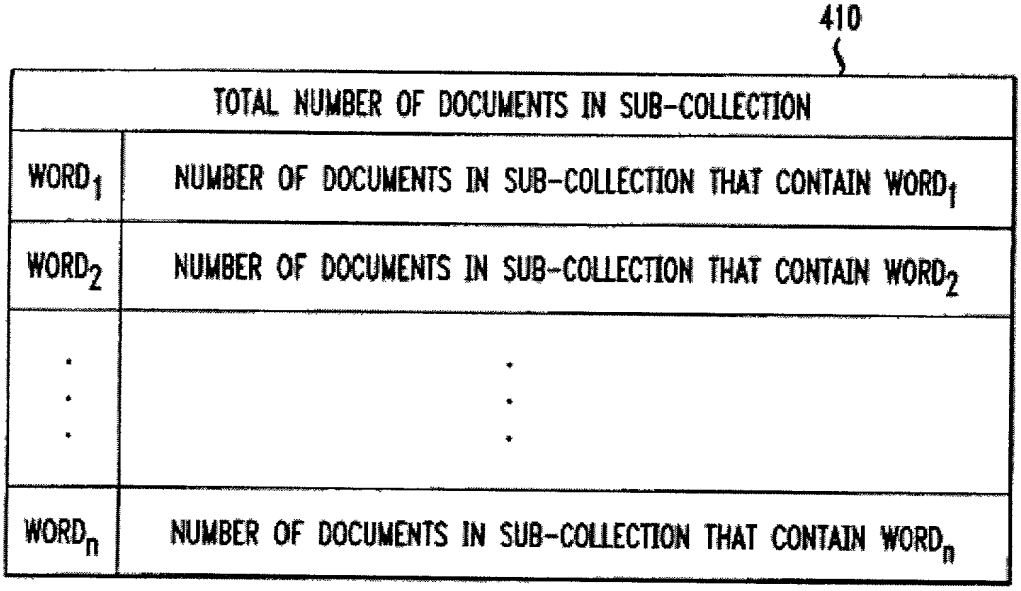

410
TOTAL NUMBER OF DOCUMENTS IN SUB-COLLECTION
WORD1
NUMBER OF DOCUMENTS IN SUB-COLLECTION THAT CONTAIN WORD1
WORD2
NUMBER OF DOCUMENTS IN SUB-COLLECTION THAT CONTAIN WORD2
WORDn
NUMBER OF DOCUMENTS IN SUB-COLLECTION THAT CONTAIN WORDn

FIGURE 18

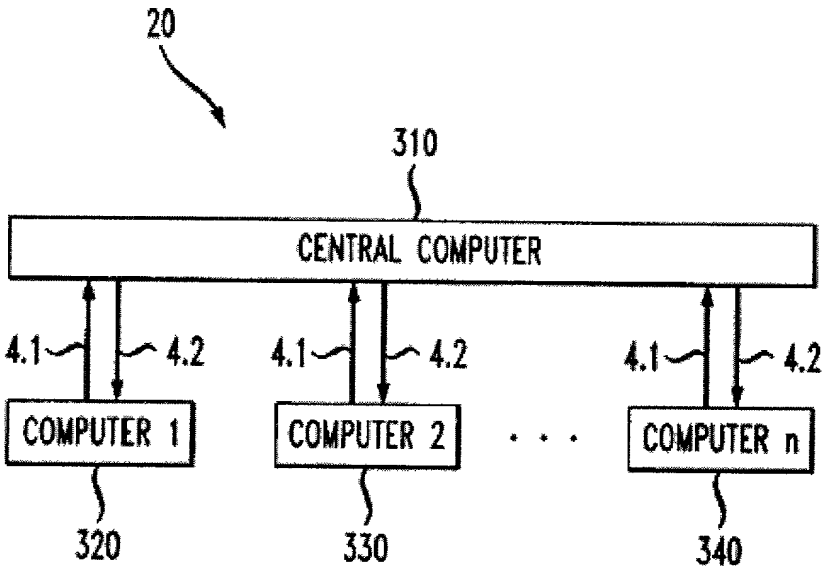

20
310
CENTRAL COMPUTER
4.1
4.2
4.1
4.2
4.1
4.2
COMPUTER 1
COMPUTER 2
COMPUTER n
320
330
340

FIGURE 19

510

TOTAL NUMBER OF DOCUMENTS IN ALL OF THE SUB-COLLECTIONS	
$WORD_1$	TOTAL NUMBER OF DOCUMENTS THAT CONTAIN $WORD_1$
$WORD_2$	TOTAL NUMBER OF DOCUMENTS THAT CONTAIN $WORD_2$
. . .	. . .
$WORD_n$	TOTAL NUMBER OF DOCUMENTS THAT CONTAIN $WORD_n$

FIGURE 20